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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 060126

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TEACHER, GRADE OR GRAMMAR SCHOOL (education) 0-30.11

TEACHER, HIGH SCHOOL (education) 0-31.01

B-335 S-87

(Supersedes B-241)

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U. S. Employment Service
in Cooperation with
Florida, Pennsylvania, Utah and Texas
State Employment Services

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TEACHER, GRADE OR GRAMMAR SCHOOL (education) 0-30.11
TEACHER, HIGH SCHOOL (education) 0-31.01

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Summary

The General Aptitude Test Battery was administered to two samples of students majoring in Education for the purpose of validating and cross-validating occupational norms. The date of criterion data collection, criterion type and the number in each Sample are shown below:

Sample	Year	Criterion	N
Validation (Florida, Pennsylvania and Utah)	1948-51	Grade-Point Average	234
Cross-Validation (Texas)	1962-63	Grade-Point Average	263

GATB Norms for Teacher, Grade or Grammar School (education) 0-30.11, B-335
Teacher, High School (education) 0-31.01, B-335 S-87

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1- H CB-1- I CB-1- J	115	G	Part 3 Part 4 Part 6	110
V	CB-1- J	105	V	Part 4	105
N	CB-1- D CB-1- I	100	N	Part 2 Part 6	95
Q	CB-1- B	95	Q	Part 1	95

Effectiveness of Norms

Validation Sample

The data in Table IV-A indicate that only 69 percent of the non-test-selected students used for this study were good students; if the students had been test-selected with the above norms, 79 percent would have been good students. 31 percent of the non-test-selected students used for this study were poor students; if the students had been test-selected with the above norms, only 21 percent would have been poor students.

Cross-Validation Sample

The data in Table IV-B indicate that only 66 percent of the non-test-selected students used for this study were good students; if the students had been test-selected with the above norms, 82 percent would have been good students. 34 percent of the non-test-selected students used for this study were poor students; if the students had been test-selected with the above norms, only 18 percent would have been poor students.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used an norms on the General Aptitude Test Battery for the occupations of Teacher, Grade or Grammar School 0-30.11 and Teacher, High School 0-31.01.

II. Sample

Validation (Utah, Florida and Pennsylvania)

A. Utah
The GATB, B-1001, was administered in May 1948 to 123 of the 186 students enrolled in the School of Education at the University of Utah, Salt Lake City, Utah. All of the students in the sample were to receive Bachelor's degrees in June 1948 in either Elementary or Secondary Education. Testing was done on a voluntary basis.

B. Florida
The GATB, B-1001, was administered to 138 senior students at Florida State University, Tallahassee, Florida, who were being certified to teach in the field of secondary education. All of these students were expected to go out during the spring term to intern in the high schools throughout the State in preparation for their certification in secondary education. A survey of the student personnel records indicated that adequate criterion data were not available for 57 students, which reduced the final sample to 81 students.

C. Pennsylvania
The GATB, B-1001, was administered in October 1950 to a sample of 38 senior students majoring in elementary education at Clarion State Teachers College, Clarion, Pennsylvania. Eight students were omitted from the sample because of incomplete criterion data. Therefore the final sample includes 30 students.

Cross-Validation Sample (Texas)

Sample I

The GATB, B-1002A (Part 1 through Part 7), was administered during the period 1954 through 1958 to seven male students and one hundred eighty-three female students enrolled in the School of Elementary Education at North Texas State University, Denton, Texas. Two male students and twenty-seven female students were eliminated from the sample because birthdate and/or grade point average information was not available. This resulted in a final sample of one hundred sixty individuals comprised of five male and one hundred fifty-five female students.

Sample II

The GATB, B-1002A (Part 1 through Part 7), was administered during the period 1955 through 1959 to sixty male students and forty-six female students enrolled in the School of Secondary Education, North Texas State University, Denton, Texas. Two male students and one female student were eliminated from the sample because of invalid test results, resulting in a final sample of one hundred three individuals comprised of fifty-eight male and forty-five female students.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

Cross-Validation Sample (Texas)

N = 263	M	σ	Range
Age (years)	21.7	5.2	16-46

III. Job Description

Job Title: Teacher, Grade or Grammar School 0-30.11

Job Summary: Instructs pupils of grade or grammar schools in rural or urban communities. Works up teaching outline. Keeps various class attendance books and records. Assigns and hears lessons. Lectures on subjects relative to lessons. May be designated according to grade taught, such as fourth-grade teacher or fifth-grade teacher. In rural schools, usually teaches grades from first to eighth.

Job Title: Teacher, High School 0-31.01

Job Summary: Teaches pupils in church, private or public high schools (secondary schools) usually specializing in one or several subjects, such as English, Mathematics or Latin.

Work Performed: NOTE: The following duties reflect the work generally performed by both elementary and secondary school teachers. However, these duties may vary, depending on the particular school system.

Prepares Lessons, Schedules and Assignments: Plans subject matter for presentation and develops particular assignments for pupils so that subject can be presented in scheduled manner. Determines level of difficulty of subject matter and estimates probable length of time for completion. Develops sample problems or other examples to introduce assignments properly and devises other methods for introduction of assignment so that material can be made as interesting as possible from the pupil's point of view. Incorporates use of charts, pictures, graphs, duplicated work sheets, or other aids to make possible ready comprehension. Evaluates individual cases in terms of proposed lessons and prepares material so that it will be challenging enough to the most advanced pupil in class and not above the capacity of the least advanced pupil. May alter individual assignments to reflect individual progress. Adapts text book material to fit into the pupil's scope of experience by including in lessons and assignments specific examples.

Develops lesson plan for subsequent week or ten days by outlining material to be covered, method of presentation, textbook references, and other aids to be used. Determines whether assignment can be accomplished in classroom or whether home assignments are necessary. May revise assignments according to need or desire for home work. May prepare lessons for different groups in same grade, as pupils are sometimes divided into groups for working efficiency. May prepare lesson on blackboard prior to classroom session for ease of assignment or instruction. Plans special activities and programs for particular grade(s) taught to coincide with observance of certain commemorative dates such as Thanksgiving, Christmas, Easter, etc. Orders special supplies if needed for a particular assignment. May develop test for particular assignment or as a review of previous assignments or may choose standardized test to be used for this purpose. Reviews previous lessons and

assignments in order to make present assignment more interesting and meaningful. Plans definite uses of standardized tests in certain subjects at certain times as prescribed by school boards or Supervising Principal's policy.

Conducts Classroom Sessions: Makes assignments, calls for pupil responses, and reviews lesson progress. Constantly attempts to set proper example of classroom decorum by use of good manners by word, action and other example with the group and the individual student. Attempts to encourage individual thought by asking pertinent questions. Prompts a sense of competition among pupils, but exercises tact in avoiding a feeling of embarrassment in a pupil who may have responded incorrectly so that pupil is not hesitant in answering subsequent questions. Uses varied explanations to clarify point that may not have been understood by group or individual student. Exercises control over classroom situation at all times by securing acceptance and respect of pupils. Listens attentively and shows genuine interest in comments of the pupils. Directs pupils' approach to study assignment in various and related ways, i.e., may read particular poem, give pupils printed copies of poem, discuss its meaning, having pupils copy poem with pen and ink, commit to memory and recite at a later date. (Since elementary school teacher is expected to teach approximately eight different subjects, this approach is most effective as it tends to use one subject to aid in learning another or several others. The teaching of all subjects is, therefore, integrated one with the other and all with actual experiences.) May work with two groups and two subjects simultaneously depending on grade taught, size of class, capacity of pupils, and other factors that would seem to indicate divided class for more efficient instruction. May have individual pupils working on different assignments, subjects, or projects at same time. Maintains constant evaluation of individual and group progress so that situations indicative of specialized attention can be detected and remedied. Adapts method of presentation to situations as they arise in classroom; relates examples arising from classroom incidents to emphasize subject being presented. Presents subject material in any way possible to make it interesting and meaningful so that prescribed standards are maintained and pupil growth is assured.

Conducts Program of General Social Education: Reads passages from Bible and conducts salute to flag. Conducts regular fire drills on a periodic basis so that pupils understand methods used to maintain safety in case of fire; points out dangers of panic as opposed to orderly evacuation of building.

Provides information on general subjects such as dangerous effects of alcohol and narcotics on human beings and the social implications of their use. Points out the responsibilities of an individual citizen in an organized society and the obligation of citizenship so that pupils will be better able to adjust to a group-living situation. Adapts varied examples of classroom grouping to relate the cooperating living approach to pupils. Stresses the need for each individual's assumption of responsibilities for the welfare of other individuals so that pupils will be enabled, through examples, to assume their responsibilities in social living. Plans and conducts special visits and tours to civic functions and to points of area interest to broaden the

areas of pupil understanding and information by using information found in an actual situation to illustrate a concept. Assigns responsibilities to pupils on such visits so that civic obligations are stressed and cooperative theme of self-government is emphasized. Uses leadership assignment technique to develop leadership qualities in pupils. Exercises caution in making leadership assignments to avoid feelings of inferiority among pupils.

Performs Related Duties as Required: Maintains physical properties of classroom by adjusting temperature, ventilation, and lighting, and making other adjustments for pupil comfort and health. Maintains proper supply levels, requisitions necessary books, graphic materials, and expendable supplies such as ink, chalk, pencils. Illustrates to pupils methods of care and conservation of materials and supplies and controls distribution to avoid waste and to assure proper usage. Encourages neatness and "good housekeeping" by impressing on pupils proper use of waste-baskets, cloak room, care of furniture and school grounds and equipment. Utilizes every resource and situation to teach by example so that impressions gained by pupils are meaningful.

Maintains Progress and Related Records: Records on a continuing basis, the progress made by individual pupils. Notes test scores and marks made on individual classroom exercises; computes class and individual averages; maintains record of absences and reasons for same; notes particular disciplinary problems and gathers data for case histories of particular problems. Scores test papers and records pupils' marks in continuing record so that progress can be determined and remedial action taken in cases of pupil weaknesses. Maintains record of classroom assignments and homework assignments. Completes periodic report cards for each pupil by consulting daily records, test scores, and from classroom observations, so that pupils' parents can be informed of pupil progress. Discusses progress and/or any particular problems of pupils with parents either by personal visit or by communication such as correspondence. Prepares periodic reports and refers matters of acute disciplinary nature, together with pertinent details. Maintains a bulletin board and schedules for benefit of pupils in classroom; may assign this function to pupils in an effort to foster feeling of responsibility and teamwork among pupils.

IV. Experimental Battery

Validation Sample (Utah, Florida and Pennsylvania)

All of the tests of the GATB, B-1001, with the exception of Parts M, N, O and P were administered to the Utah and Florida samples. All of the tests of the GATB, B-1001, were administered to the Pennsylvania sample.

Cross-Validation Sample (Texas)

The GATB, B-1002A (Part 1 through Part 7), was administered to both groups of the cross-validation sample.

V. Criterion

Validation Sample (Utah, Florida and Pennsylvania)

Utah

The criterion for this sample consists of the total grade-point averages for the four year course of instruction. To compute the grade-point average the following honor points were assigned to each letter grade: A = 3 points, B = 2 points, C = 1 point, D = 0 points and E = -1 point.

The grade-point average is the ratio between the total number of honor points and the total number of credit hours earned. The distribution of grade-point averages ranged from 1.0 to 2.9 with a mean of 1.9 and a standard deviation of .40.

Florida

The criterion consists of grade point averages computed on the basis of a minimum of seven quarters and a maximum of nine quarters. The grade-point averages do not include the first term of the year 1950-51. At that time the University changed over from the quarter system to the semester system which resulted in a change in method of recording and computing grade-point averages. The following points were assigned to each letter grade to compute the grade point averages: A = 3 points, B = 2 points, C = 1 point, D = 0 points and F = -1 point. The distribution of grade-point averages ranged from 1.0 to 2.8 with a mean of 1.8 and a standard deviation of .44.

Pennsylvania

The criterion consists of grade-point averages computed for 25 basic required points in the school curriculum, including student teaching. The distribution of grade-point averages ranged from 0.8 to 2.6 with a mean of 1.5 and a standard deviation of .48.

Cross-Validation Sample (Texas)

The criterion for both samples consisted of the total grade-point averages for the four year course of instruction. To compute the grade-point average the following point system was used, A = 3, B = 2 and C = 1, D and F were not used in computing the average. The total number of points was divided by the total number of semester hours in education to obtain the GPA.

VI Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Intelligence (G) - required in learning the various subjects in the curriculum, determining difficulty level of subject matter, planning presentations of subject matter, assisting pupils who have difficulties in learning, preparing classroom tests and evaluating progress of pupils.

Verbal Aptitude (V) - required to understand the contents of the courses and also to convey knowledge in teaching students.

Numerical Aptitude (N) - required to teach subjects dealing with arithmetic operations and to compute individual and class grade averages.

Clerical Perception (Q) - required in keeping records for the school and in reviewing the work of the students.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 234

Aptitudes	M	σ
G-Intelligence	124.0	14.0
V-Verbal Aptitude	123.6	15.1
N-Numerical Aptitude	115.6	14.2
S-Spatial Aptitude	114.9	16.6
P-Form Perception	117.5	17.0
Q-Clerical Perception	116.3	15.9
* A-Aiming	114.3	18.7
** T-Motor Speed	112.1	20.8
*** F-Finger Dexterity	108.6	18.8
*** M-Manual Dexterity	91.1	19.4

*N = 231, **N =229, ***N = 30

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X	X			X			
Irrelevant									
Relatively High Mean	X	X			X				
Relatively Low Sigma	X		X						
Significant Correlation with Criterion									
Aptitudes to be Considered for Trial Norms	G	V	N			Q			

Trial norms consisting of various combinations of Aptitudes G,V,N and Q with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of G-110, V-105, N-95 and Q-95 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 31 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal students.

Table IV-A shows the relationship between test norms consisting of Aptitudes G, V, N and Q with critical scores of 110, 105, 95 and 95 respectively, and the dichotomized criterion for Teacher, Grade or Grammar 0-30.11 and Teacher, High School 0-31.01. Students in the high criterion group have been designated as "good students" and those in the low criterion group as "poor students."

TABLE IV-A

Validity of Test Norms for
Teacher, Grade or Grammar School 0-30.11
Teacher High School 0-31.01
(G-110, V-105, N-95, Q-95)

Validation Sample (Utah, Florida, and Pennsylvania)

N = 234	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Students	39	123	162
Poor Students	40	32	72
Total	79	155	234

Phi Coefficient = .307
χ^2 = 21.996
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VII. Validity of Norms

Table IV-B shows the relationship between test norms consisting of Aptitudes G, V, N, and Q with critical scores of 110, 105, 95 and 95 respectively, and the dichotomized criterion for the cross-validation sample. Students in the high criterion group have been designated as "good students" and those in the low criterion group as "poor students."

TABLE IV-B

Validity of Test Norms for
Teacher, Grade or Grammar School 0-30.11
Teacher, High School 0-31.01
(G-110, V-105, N-95, Q-95)

Cross-Validation Sample (Texas)

N = 263	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Students	77	98	175
Poor Students	66	22	88
Total	143	120	263

Phi Coefficient = .294
χ^2 = 14.018
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, V, N and Q with minimum scores of 110, 105, 95, 95, respectively, have been established as B-1002 norms for Teacher, Grade or Grammar School 0-30.11 and Teacher, High School 0-31.01. The equivalent B-1001 norms consist of G-115, V-105, N-100, Q-95.

IX. Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation studied into OAP-3 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962.